RELIABILITY REPORT

FOR

MAX6751KAxx

PLASTIC ENCAPSULATED DEVICES

February 20, 2003

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Written by

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Conclusion

The MAX6751 successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards.

Table of Contents

I. Device Description

A. General

The MAX6751 low-power microprocessor (µP) supervisory circuit monitors single/dual system supply voltages from 1.575V to 5V and provide maximum adjustability for reset and watchdog functions. This devices asserts a reset signal whenever the V_{CC} supply voltage or RESET IN falls below its reset threshold or when manual reset is pulled low. The reset output remains asserted for the reset timeout period after V_{CC} and RESET IN rise above the reset threshold. The reset function features immunity to power-supply transients.

The MAX6751 have ±2% factory-trimmed reset threshold voltages in approximately 100mV increments from 1.575V to 5.0V and/or adjustable reset threshold voltages using external resistors.

The reset and watchdog delays are adjustable with external capacitors. The MAX6751 contains a watchdog select input that extends the watchdog timeout period by 128x.

The MAX6751 is available with a push-pull or open-drain active-low RESET-bar output. The MAX6751 is available in an 8-pin SOT23 package and is fully specified over the automotive temperature range (-40°C to +125°C).

B. Absolute Maximum Ratings

Item	Rating
VCC to GND	-0.3V to +6.0V
SRT, SWT, SET0, SET1, RESET IN, WDS, MR, WDI, to GND	-0.3V to (VCC + 0.3V)
RESET (Push-Pull) to GND	-0.3V to (VCC + 0.3V)
RESET (Open Drain) to GND	-0.3V to +6.0V
Input Current (All Pins)	±20mA
Output Current (RESET)	±20mA
Operating Temperature Range	-40°C to +125°C
Storage Temperature Range	-65°C to +150°C
Junction Temperature	+150°C
Lead Temperature (soldering, 10s)	+300°C
Continuous Power Dissipation (TA = +70°C)	
8-Pin SOT23	714mW
Derates above +70°C	
8-Pin SOT23	8.90mW/°C

II. Manufacturing Information

A. Description/Function:	µP Reset Circuits with Capacitor-Adjustable Reset/Watchdog Timeout Delay
B. Process:	B8 (Standard 0.8 micron silicon gate CMOS)
C. Number of Device Transistors:	1100
D. Fabrication Location:	California, USA
E. Assembly Location:	Malaysia
F. Date of Initial Production:	January, 2003

III. Packaging Information

A. Package Type:	**8-Pin SOT23**
B. Lead Frame:	Copper
C. Lead Finish:	Solder Plate
D. Die Attach:	Silver-filled Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	# 05-9000-0417
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard JESD22-112:	Level 1

IV. Die Information

A. Dimensions:	24 x 80 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts: Jim Pedicord (Reliability Lab Manager)
Bryan Preeshl (Executive Director**)**
Kenneth Huening (Vice President)

B. Outgoing Inspection Level: 0.1% for all electrical parameters guaranteed by the Datasheet.
0.1% For all Visual Defects.

C. Observed Outgoing Defect Rate: < 50 ppm

D. Sampling Plan: Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135°Cbiased (static) life test are shown in **Table 1** Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4389 \times 45 \times 2}$$ (Chi square value for MTTF upper limit)

Temperature Acceleration factor assuming an activation energy of 0.8eV

$\lambda = 24.13 \times 10^{-9}$

$\lambda = 24.13$ F.I.T. (60% confidence level @ 25°C)

This low failure rate represents data collected from Maxim's reliability monitor program. In addition to routine production Burn-In, Maxim pulls a sample from every fabrication process three times per week and subjects it to an extended Burn-In prior to shipment to ensure its reliability. The reliability control level for each lot to be shipped as standard product is 59 F.I.T. at a 60% confidence level, which equates to 3 failures in an 80 piece sample. Maxim performs failure analysis on any lot that exceeds this reliability control level. Attached Burn-In Schematic (Spec. # 06-6036) shows the static Burn-In circuit. Maxim also performs quarterly 1000 hour life test monitors. This data is published in the Product Reliability Report (**RR-1M**).

B. Moisture Resistance Tests

Maxim pulls pressure pot samples from every assembly process three times per week. Each lot sample must meet an LTPD = 20 or less before shipment as standard product. Additionally, the industry standard 85°C/85%RH testing is done per generic device/package family once a quarter.

C. E.S.D. and Latch-Up Testing

The MS62-5 die type has been found to have all pins able to withstand a transient pulse of ±2000V per Mil-Std-883 Method 3015 (reference attached ESD Test Circuit). Latch-Up testing has shown that this device withstands a current of ±250mA.

Table 1
Reliability Evaluation Test Results

MAX6751KAxx

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	PACKAGE	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)					
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality		45	0
Moisture Testing (Note 2)					
Pressure Pot	Ta = 121°C P = 15 psi. RH= 100% Time = 168hrs.	DC Parameters & functionality	SOT23	77	0
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality		77	0
Mechanical Stress (Note 2)					
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters		77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data

Attachment #1

TABLE II. Pin combination to be tested. 1/ 2/

	Terminal A (Each pin individually connected to terminal A with the other floating)	Terminal B (The common combination of all like-named pins connected to terminal B)
1.	All pins except V_{PS1} 3/	All V_{PS1} pins
2.	All input and output pins	All other input-output pins

1/ Table II is restated in narrative form in 3.4 below.
2/ No connects are not to be tested.
3/ Repeat pin combination I for each named Power supply and for ground

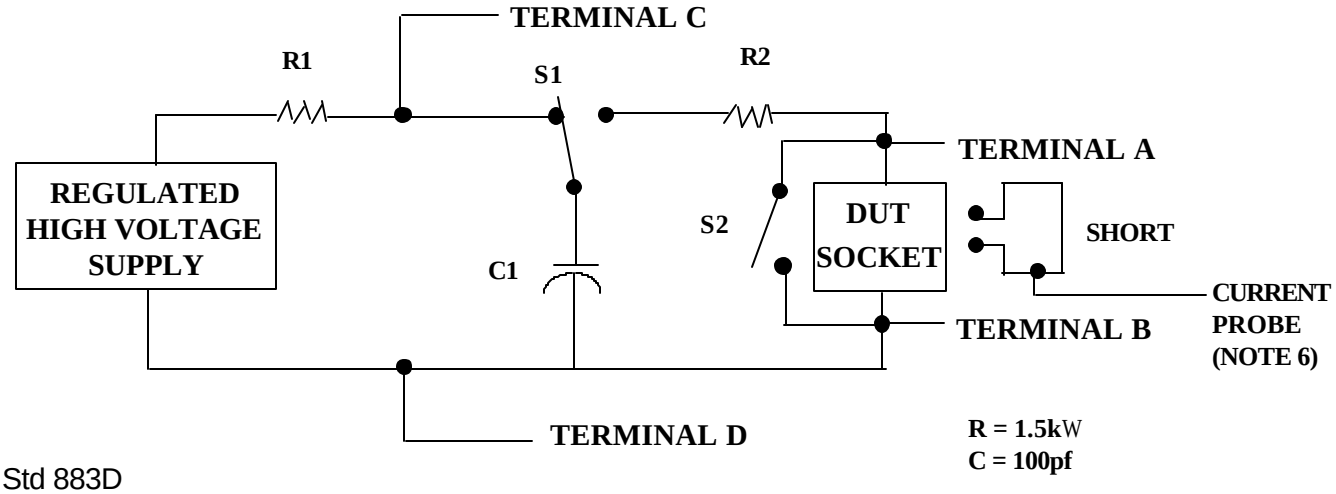
(e.g., where V_{PS1} is V_{DD}, V_{CC}, V_{SS}, V_{BB}, GND, $+V_S$, $-V_S$, V_{REF}, etc).

3.4 Pin combinations to be tested.

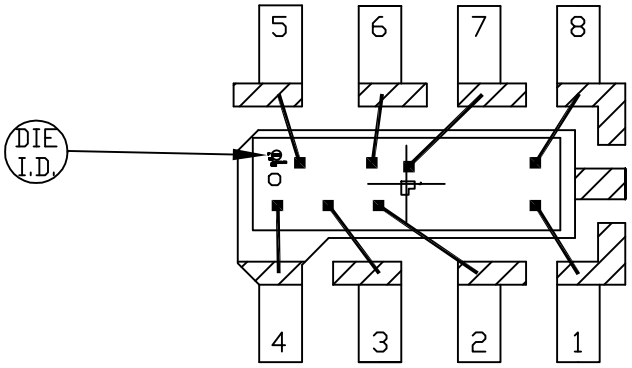
a. Each pin individually connected to terminal A with respect to the device ground pin(s) connected to terminal B. All pins except the one being tested and the ground pin(s) shall be open.

b. Each pin individually connected to terminal A with respect to each different set of a combination of all named power supply pins (e.g., V_{SS1}, or V_{SS2} or V_{SS3} or V_{CC1}, or V_{CC2}) connected to terminal B. All pins except the one being tested and the power supply pin or set of pins shall be open.

c. Each input and each output individually connected to terminal A with respect to a combination of all the other input and output pins connected to terminal B. All pins except the input or output pin being tested and the combination of all the other input and output pins shall be open.



Mil Std 883D
Method 3015.7
Notice 8



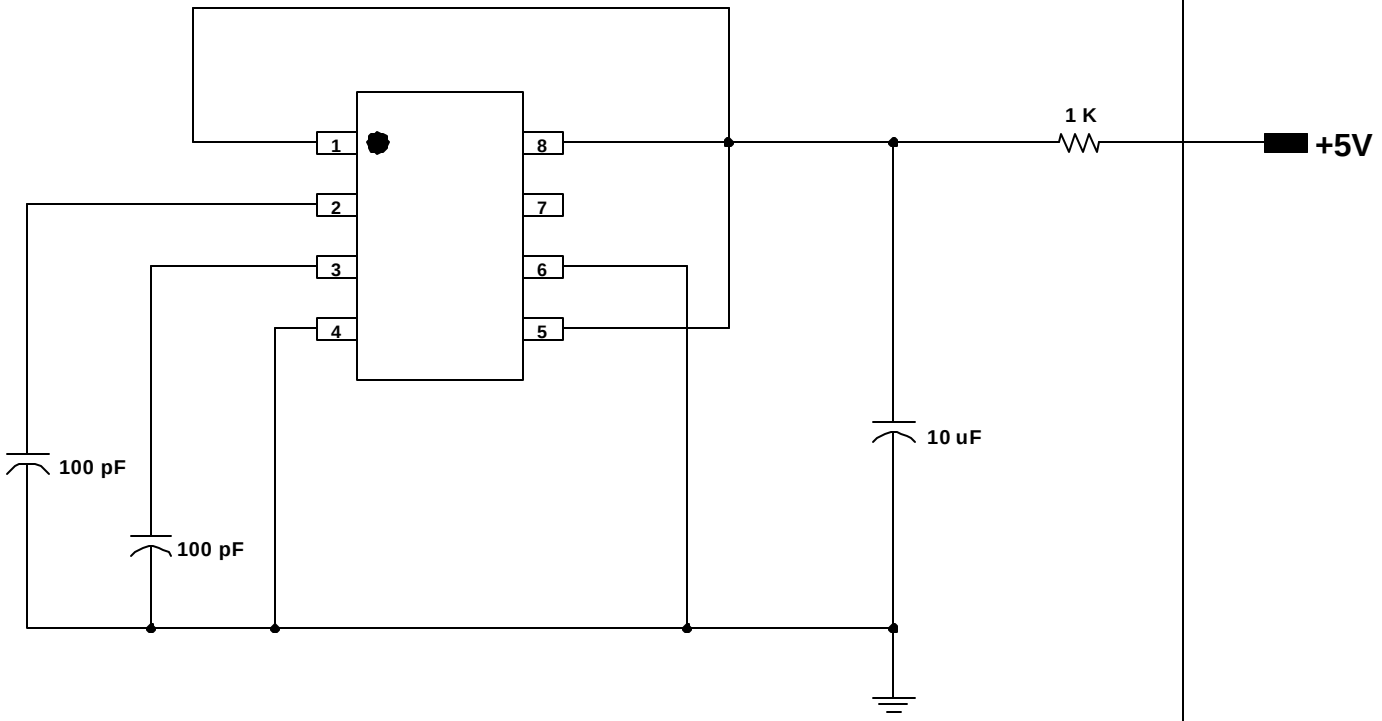
NOTE: CAVITY DOWN

BONDABLE AREA

PKG. CODE: K8-5		SIGNATURES	DATE	MAXIM CONFIDENTIAL & PROPRIETARY	
CAV./PAD SIZE: 88x28	PKG.			BOND DIAGRAM #: 05-9000-0417	REV: A
	DESIGN				

ONCE PER SOCKET

ONCE PER BOARD



DEVICES: MAX 6750
PACKAGE: 8-SOT
MAX. EXPECTED CURRENT = 6.5 uA

DRAWN BY: TEK TAN
NOTES: